

REPORT DOCUMENTATION PAGE

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4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
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INSTRUCTIONS FOR COMPLETING SF 298

1. REPORT DATE. Full publication date, including day, month, if available. Must cite at least the year and be Year 2000 compliant, e.g. 30-06-1998; xx-06-1998; xx-xx-1998.

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4. TITLE. Enter title and subtitle with volume number and part number, if applicable. On classified documents, enter the title classification in parentheses.

5a. CONTRACT NUMBER. Enter all contract numbers as they appear in the report, e.g. F33615-86-C-5169.

5b. GRANT NUMBER. Enter all grant numbers as they appear in the report, e.g. AFOSR-82-1234.

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES). Self-explanatory.

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14. ABSTRACT. A brief (approximately 200 words) factual summary of the most significant information.

15. SUBJECT TERMS. Key words or phrases identifying major concepts in the report.

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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE April 1993	3. REPORT TYPE AND DATES COVERED FINAL: Jul 92 - Mar 93		
4. TITLE AND SUBTITLE Determination of Body Density for Twelve Bird Species		5. FUNDING NUMBERS PE - 64212F PR - 1926 TA - 01 WU - 10		
6. AUTHOR(S) David M. Hamershock (513-255-6524) ¹ Thomas W. Seamans (419-625-0242) ² Glen E. Bernhardt (419-625-0242) ²		8. PERFORMING ORGANIZATION REPORT NUMBER WL-TR-93-3049		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Flight Dynamics Directorate Wright Laboratory, AFMC Wright-Patterson AFB OH 45433-7562 ² USDA, Denver Wildlife Research Center 6100 Columbus Ave, Sandusky OH 44870		10. SPONSORING/MONITORING AGENCY REPORT NUMBER WL-TR-93-3049		
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12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) Body density, mass, wingspan, and circumference measurements were completed on 12 bird species to better understand the bird/aircraft collision hazard. Body densities for the 12 species ranged from 0.602-0.918 g/cm ³ dry, 0.743-0.947 g/cm ³ wet, and 0.880-1.050 g/cm ³ plucked. The mean length-to-diameter ratio of the 12 species was 4.8 ± 0.3. Significant negative correlations were found between dry density (N = 144) and wingspan (r = -0.52, p < 0.001), dry circumference (r = -0.229, p < 0.006), or body length (r = -0.264, p < 0.001). The percent of body mass represented by feathers differed among species, but not by sex or sex x species. Herring Gulls, Turkey Vultures, and Laughing Gulls had 9-10 % of their body mass in feathers while seven other species had 2-4 % of their body mass in feathers. An understanding of avian body density is essential to 1) aid standardization of international birdstrike testing techniques, 2) establish the acceptability and validity of using "artificial" birds for aircraft birdstrike testing, 3) establish birdstrike resistance standards for aircraft components, and 4) aid computer modeling of bird bodies.				
14. SUBJECT TERMS Bird Strike Testing, Aircraft Collisions, Bird Density, Bird Length, Bird Mass, Bird Circumference, Wingspan, Artificial Birds, Bird Feathers, Bird Strike Standards		15. NUMBER OF PAGES 20		
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